

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
6 May 2004 (06.05.2004)

PCT

(10) International Publication Number
WO 2004/037102 A1

(51) International Patent Classification⁷: **A61B 18/18**

(21) International Application Number:
PCT/IB2003/004459

(22) International Filing Date: 9 October 2003 (09.10.2003)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
PI2002A000059 22 October 2002 (22.10.2002) IT

(71) Applicant and

(72) Inventor: **LONGO, Iginio** [IT/IT]; Largo Duca D'Aosta, 11, I-56123 Pisa (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **TOSORATTI, Nevio** [IT/IT]; Via R. Alessandri, 50, I-00151 Roma (IT).

(74) Agent: **CELESTINO, Marco**; ABM Agenzia Brevetti & Marchi, Viale Giovanni Pisano, 31, I-56123 Pisa (IT).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

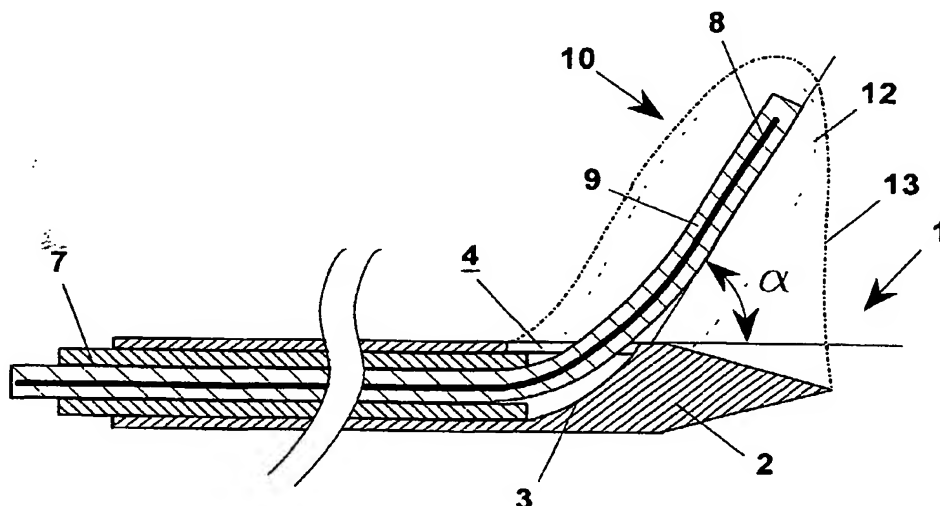
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: INTERSTITIAL MICROWAVE ANTENNA WITH LATERAL EFFECT FOR TISSUES HYPERTHERMIA IN MINIMAL INVASIVE SURGERY



(57) Abstract: Application device (1), for example, a metal needle or a plastic catheter that has in the end portion (2) of the free end a gradually increasing thickness to form substantially a chute guide (3) which ends at a side opening (4) made on the application device (1). This way, an interstitial antenna (10) is obtained formed by a co-axial tube having an external conductor (7), by a dielectric layer (9) and by a central conductor (8) embedded in the dielectric layer (9) that insulates it from the external conductor (7). The antenna (10) can be put in a target tissue, along an actuation direction forming an angle α with the introduction direction. This way, the antenna (10) achieves an actual surface isothermal, i.e. a mass of tissue actually coagulated within a curved surface (13), since the tip of the application device (1) is connected electrically with the external conductor (7) and increases its area of action.

WO 2004/037102 A1

BEST AVAILABLE COPY

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/ 3/04459

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B18/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 599 294 A (LUNDQUIST INGEMAR H ET AL) 4 February 1997 (1997-02-04)	1, 3
Y	column 7, line 29 - column 8, line 16; figures 5, 7-9	2, 4
X	WO 95 10253 A (UROLOGIX INC) 20 April 1995 (1995-04-20) page 9, line 1 - line 5 page 6, line 8 - line 13; figure 3	1, 3
X	US 6 044 846 A (EDWARDS STUART D) 4 April 2000 (2000-04-04) column 5, line 42 - line 65; figures 6, 7	1
Y	US 2002/058932 A1 (MOORMAN JACK W ET AL) 16 May 2002 (2002-05-16) paragraphs '0046!, '0055!; figure 2	4
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

19 February 2004

Date of mailing of the international search report

27/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Mayer-Martenson, E

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/73/04459

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>US 5 456 662 A (DOUGLASS DAVID L ET AL) 10 October 1995 (1995-10-10) column 4, line 35 - line 41; figures 5,6 -----</p>	2

INTERNATIONAL SEARCH REPORT

International

Application No

PCT/IB/04459

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5599294	A	04-02-1997	AT 132046 T 15-01-1996
		AU 671405 B2 22-08-1996	
		AU 2047595 A 10-08-1995	
		AU 657235 B2 02-03-1995	
		AU 4999893 A 15-03-1994	
		BR 9306893 A 08-12-1998	
		CA 2121032 A1 03-03-1994	
		CA 2226484 A1 03-03-1994	
		DE 4305663 A1 17-02-1994	
		DE 69301143 D1 08-02-1996	
		DE 69325164 D1 08-07-1999	
		DE 69325164 T2 25-05-2000	
		EP 0611314 A1 24-08-1994	
		EP 0629382 A1 21-12-1994	
		EP 0893101 A2 27-01-1999	
		ES 2084510 T3 01-05-1996	
		ES 2134295 T3 01-10-1999	
		FI 950584 A 04-04-1995	
		FR 2694700 A1 18-02-1994	
		GB 2269538 A , B 16-02-1994	
		IL 104647 A 31-12-1995	
		JP 7503645 T 20-04-1995	
		JP 3128242 B2 29-01-2001	
		KR 273015 B1 01-12-2000	
		MX 9304905 A1 29-04-1994	
		NZ 255687 A 20-12-1996	
		US 5370675 A 06-12-1994	
		US 2001031941 A1 18-10-2001	
		US 5385544 A 31-01-1995	
		US 5421819 A 06-06-1995	
		US 6022334 A 08-02-2000	
		US 5435805 A 25-07-1995	
		US 6102886 A 15-08-2000	
		WO 9404220 A1 03-03-1994	
		US 6241702 B1 05-06-2001	
		US 5409453 A 25-04-1995	
		US 2002183740 A1 05-12-2002	
		US 5470308 A 28-11-1995	
		US 5366490 A 22-11-1994	
		US 5556377 A 17-09-1996	
		US 5720718 A 24-02-1998	
		US 5542915 A 06-08-1996	
		US 5470309 A 28-11-1995	
		US 5554110 A 10-09-1996	
		US 5549644 A 27-08-1996	
		US 5484400 A 16-01-1996	
		US 6206847 B1 27-03-2001	
		US 6129726 A 10-10-2000	
		US 5630794 A 20-05-1997	
WO 9510253	A	20-04-1995	AU 8099794 A 04-05-1995
			WO 9510253 A1 20-04-1995
US 6044846	A	04-04-2000	US 5964755 A 12-10-1999
			US 5575788 A 19-11-1996
			US 5558672 A 24-09-1996
			US 5569241 A 29-10-1996
			US 5505730 A 09-04-1996

INTERNATIONAL SEARCH REPORT

International Publication No
PCT/3/04459

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6044846	A	AU 2882199 A	15-09-1999
		WO 9943262 A1	02-09-1999
		US 2003135206 A1	17-07-2003
		US 2003024538 A1	06-02-2003
		WO 0176495 A1	18-10-2001
		US 6024743 A	15-02-2000
		US 6302898 B1	16-10-2001
		US 6006755 A	28-12-1999
		US 6009877 A	04-01-2000
		US 6056744 A	02-05-2000
		US 6092528 A	25-07-2000
		US 2003109866 A1	12-06-2003
		US 6002968 A	14-12-1999
		US 6254598 B1	03-07-2001
		US 6315776 B1	13-11-2001
		US 6405732 B1	18-06-2002
		US 2001034518 A1	25-10-2001
		US 2002115991 A1	22-08-2002
		US 2002103483 A1	01-08-2002
		AU 2871795 A	19-01-1996
		NL 1000670 C2	22-04-1996
		NL 1000670 A1	27-12-1995
		WO 9600041 A1	04-01-1996
		US 5681308 A	28-10-1997
		US 5769846 A	23-06-1998
		AU 707548 B2	15-07-1999
		AU 2998195 A	19-01-1996
		CA 2193964 A1	04-01-1996
		EP 0767629 A1	16-04-1997
		WO 9600042 A1	04-01-1996
		US 2003144659 A1	31-07-2003
		US 2002091381 A1	11-07-2002
		US 5827273 A	27-10-1998
		US 5800429 A	01-09-1998
		US 5746224 A	05-05-1998
		US 5823197 A	20-10-1998
		US 5843077 A	01-12-1998
US 2002058932	A1	US 6306132 B1	23-10-2001
		US 2003195500 A1	16-10-2003
		US 2001039416 A1	08-11-2001
US 5456662	A	US 5370675 A	06-12-1994
		US 5435805 A	25-07-1995
		US 5421819 A	06-06-1995
		US 5385544 A	31-01-1995
		US 6152143 A	28-11-2000
		US 6179803 B1	30-01-2001
		US 5514131 A	07-05-1996
		US 6416491 B1	09-07-2002
		US 5674191 A	07-10-1997
		US 5707349 A	13-01-1998
		US 5718702 A	17-02-1998
		US 5743870 A	28-04-1998
		US 5730719 A	24-03-1998
		US 5817049 A	06-10-1998
		US 5843021 A	01-12-1998
		US 5486161 A	23-01-1996

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB98/04459

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5456662	A	AT 132046 T	15-01-1996
		AU 671405 B2	22-08-1996
		AU 2047595 A	10-08-1995
		AU 657235 B2	02-03-1995
		AU 4999893 A	15-03-1994
		AU 685086 B2	15-01-1998
		AU 6133194 A	29-08-1994
		AU 718834 B2	20-04-2000
		AU 6189698 A	09-07-1998
		BR 9306893 A	08-12-1998
		CA 2121032 A1	03-03-1994
		CA 2155217 A1	18-08-1994
		CA 2226484 A1	03-03-1994
		CN 1119418 A	27-03-1996
		DE 4305663 A1	17-02-1994
		DE 69301143 D1	08-02-1996
		DE 69325164 D1	08-07-1999
		DE 69325164 T2	25-05-2000
		EP 0611314 A1	24-08-1994
		EP 0629382 A1	21-12-1994
		EP 0631514 A1	04-01-1995
		EP 0893101 A2	27-01-1999
		ES 2084510 T3	01-05-1996
		ES 2134295 T3	01-10-1999
		FI 950584 A	04-04-1995
		IL 104647 A	31-12-1995
		IL 108532 A	13-07-1997
		JP 7503645 T	20-04-1995
		JP 3128242 B2	29-01-2001
		JP 8506259 T	09-07-1996
		KR 273015 B1	01-12-2000
		MX 9304905 A1	29-04-1994
		NZ 255687 A	20-12-1996
		US 2001031941 A1	18-10-2001